



**Everything you wanted to  
know about E85, and then  
some!**

***Presented by URS Corporation***



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# Consumer Choice

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"What can I do?"

First, recycling . . . Now, fuels & vehicles

- **Consumers looking for a choice**
- **Vehicles & fuels**
- **Value of air quality**
- **The time is right**

**Government Leadership**



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# Why Alternative Fuels?

- Federal Requirements:

Energy Policy Act of 1992

Federal Fleets:

- 75% of new vehicles acquired for use must be AFVs
- Executive Order 13149 April 21,2000
- “Greening the Government” Reduce consumption of petroleum by 20% from 1999 to end of FY 2005



# Why Alternative Fuels?

- Federal Requirements:

Energy Policy Act of 1992

State Fleets:

- 75% of new vehicles acquired for use must be AFVs
- Other state and local initiatives



## What is Ethanol (E85)?

- E85 is a blend of 85% ethanol and 15% gasoline
- High octane, liquid, domestic and renewable fuel
- Ethanol is produced from corn, cheese whey, wheat, sorghum and beverage wastes
- Many producers are farmer-owned cooperatives located in rural communities
- Ethanol also produced from waste



- Burns cleaner than gasoline
- Contains ~80% less of the potential contaminants found in gasoline (example: benzene, xylene, sulfur)
- Contains ~80% less of the gum-forming compounds found in gasoline (example: olefins)
- Gallon for gallon, E85 has 75% of the energy content of gasoline
- Loss of fuel mileage of 5 to 10 percent



# Consumer Benefits of E85

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- Costs less to fuel an FFV with E85 than with gasoline E85 is typically priced less than gasoline at the pump
- Increased horsepower (+5%)
- No additional cost to own a FFV
- OEM produced & warranted same as gasoline-only models
- Fuels just like gasoline, requires no additional training





- 25% reduction in smog-forming pollutants
- 35% - 40% reduction in greenhouse gas emissions
- Increased life-expectancy/cleaner engine & fuel system
- Renewable fuel made from agricultural crops & wastes
- Reduction in our dependence on overseas oil imports



# What is an FFV?

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- Flexible fuel vehicle (FFV) specially designed to run on any ethanol blend up to 85%.
- FFVs may use any mix of gasoline or E85 – from 100% unleaded gasoline to 100% E85
- FFVs experience a mileage reduction on E85 vs gasoline
- The Engine Control Module “reads” the fuel blend, enabling drivers to fuel with E85 or gasoline in any combination.



- The computer adjusts the FFV's fuel injection and ignition timing to compensate for different fuel mixtures.
- There are no switches, no mixing or blending required.
- All fueling done in same fuel "filling system".
- No special training needed to fuel vehicle.
- No additional fuel tanks or loss of trunk space.
- No on-board storage tanks other than OEM tank



## So, where do I get E85?

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- Ethanol is shipped from plant as denatured ethanol by truck, barge, or rail
- Denatured ethanol - poisoned to prevent human consumption
- Stored at terminals in 95% blend
- Blended (mixed) with gasoline for E10 and for RFG and oxy-fuels
- Any terminal that offers E10 can produce E85
- \$0.54 per gallon tax “incentive” at wholesale basis



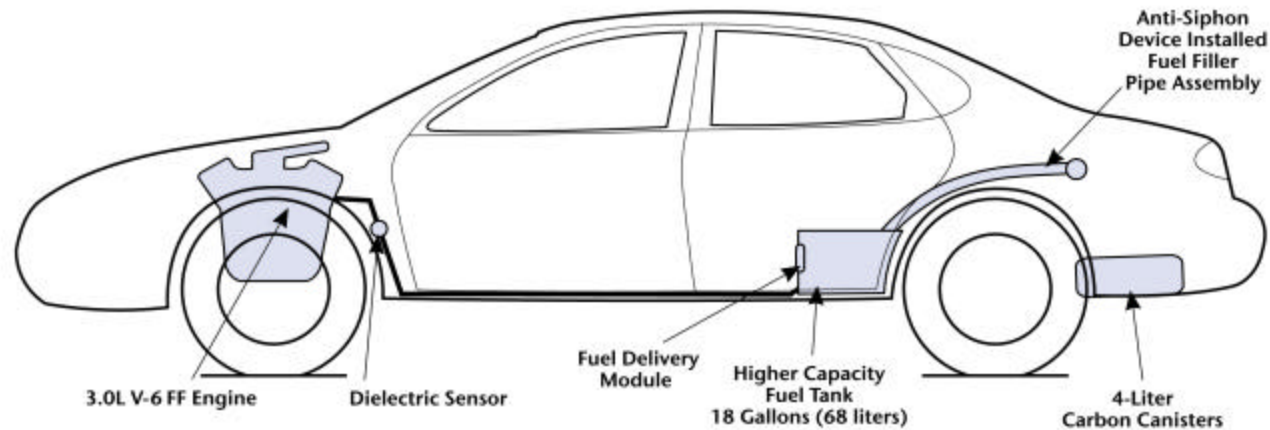
# What's different in an FFV?

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- Fuel sensor that detects ethanol/gasoline ratio
- Stainless steel fuel tank
- Teflon lined fuel hoses
- Slight modifications to:
  - Fuel injectors
  - Computer system
  - Anti-siphon device
- Customer 'flexibility' to choose either fuel



# Flexible Fuel System



**E85 Range: 250-340 miles**

**Gasoline Range: 340-470 miles**

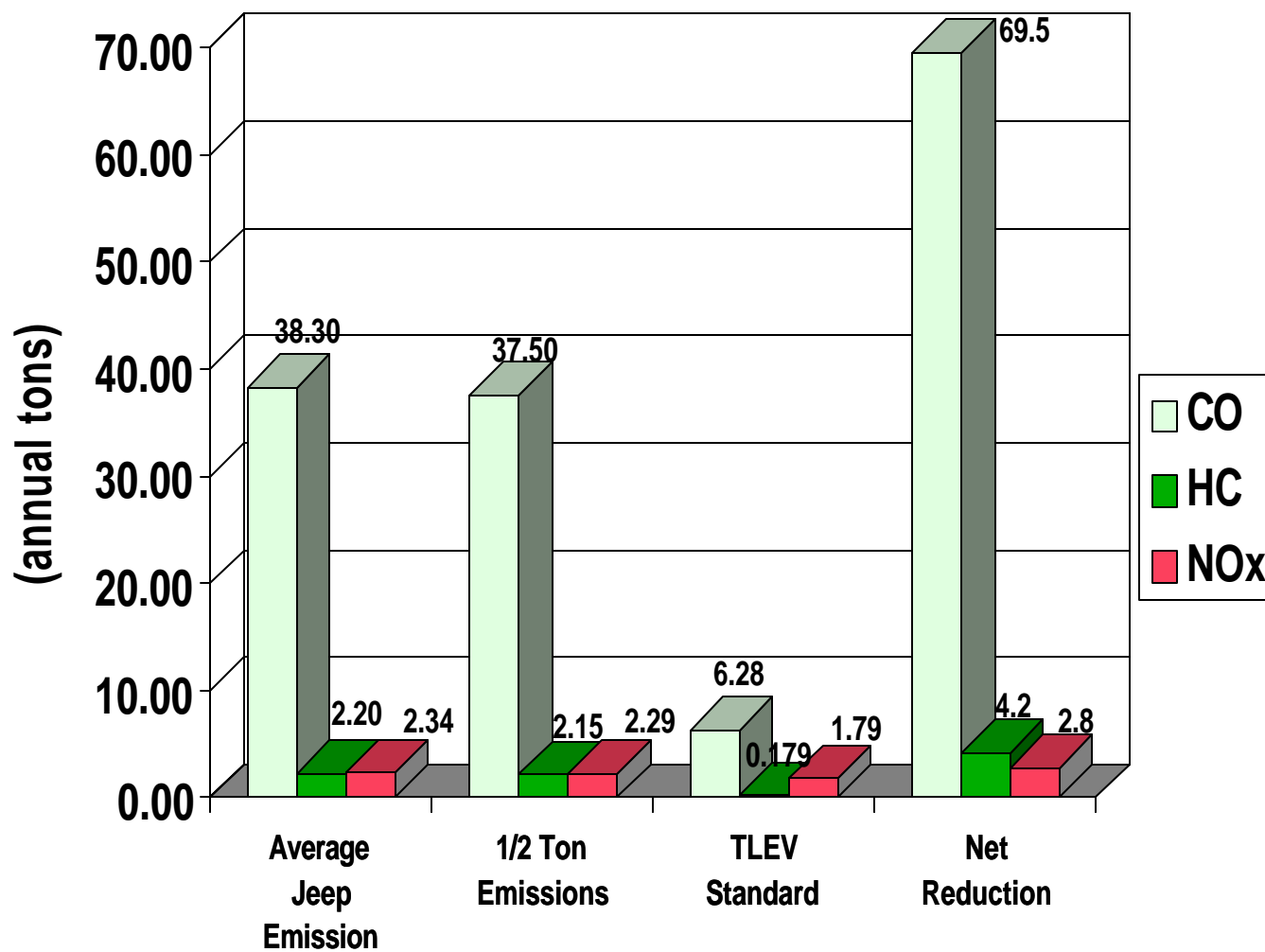
**A mileage reduction will be experienced with E85 compared to gasoline**



- 22,500 E85 delivery vehicles being delivered to USPS by Ford Motor Company
- Vehicles being placed across nation
  - Charlotte, NC 205 + 120
  - Fayetteville, NC 81 + 80
  - Greenville, SC 88
  - Columbia, SC 62
  - Charleston, SC 66
  - Denver, CO 810



## JEEP & 1/2 TON EMISSIONS VS TLEV STANDARD

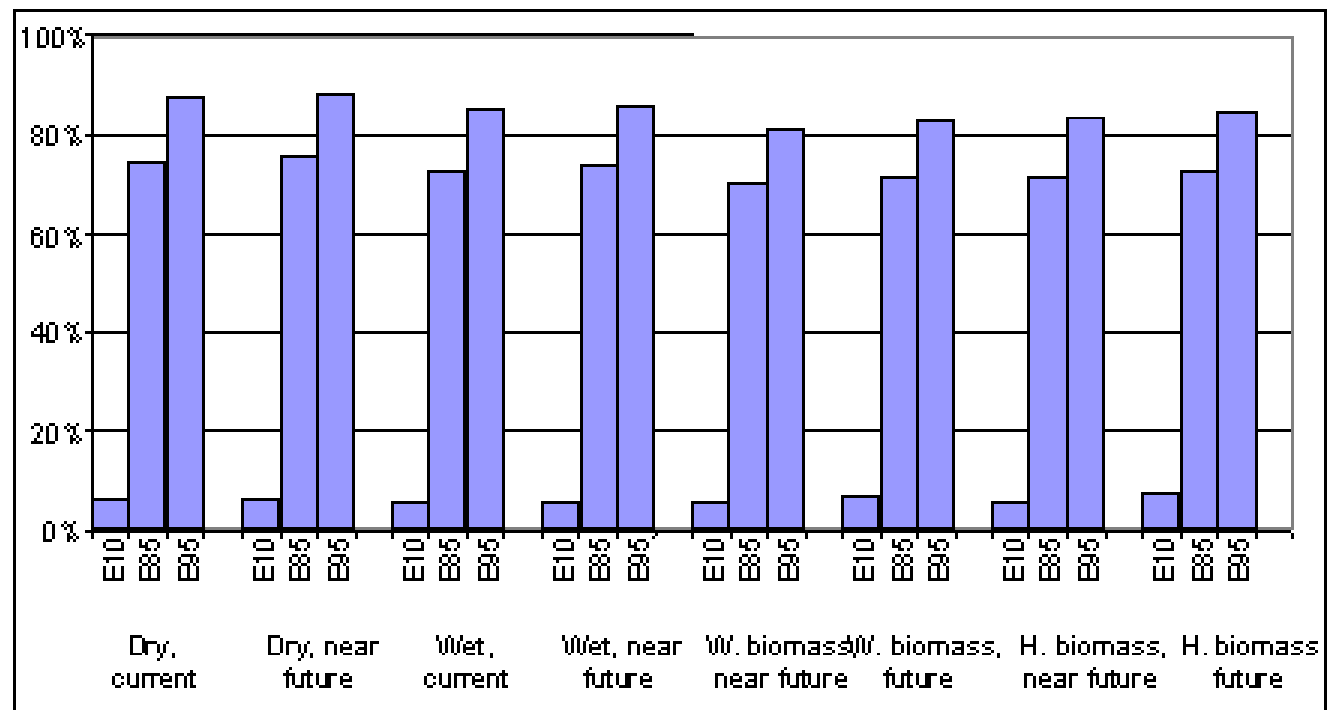


June 3-6, 2000





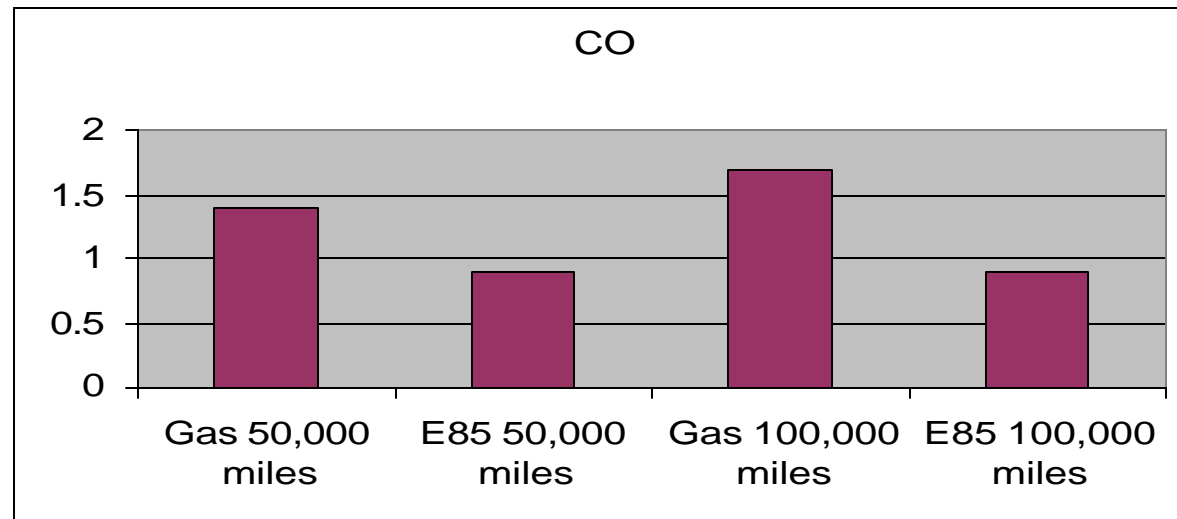
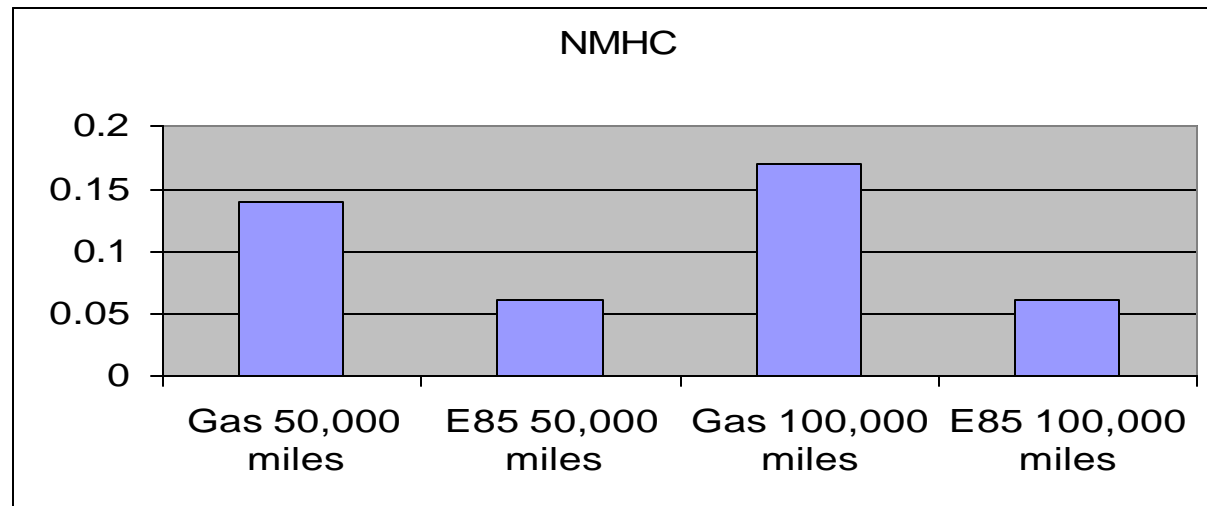
## Effects of Ethanol Blends: Per-Mile Petroleum Use Changes (% Relative to Gasoline)



Argonne National Laboratory  
Transportation Technology R&D Center

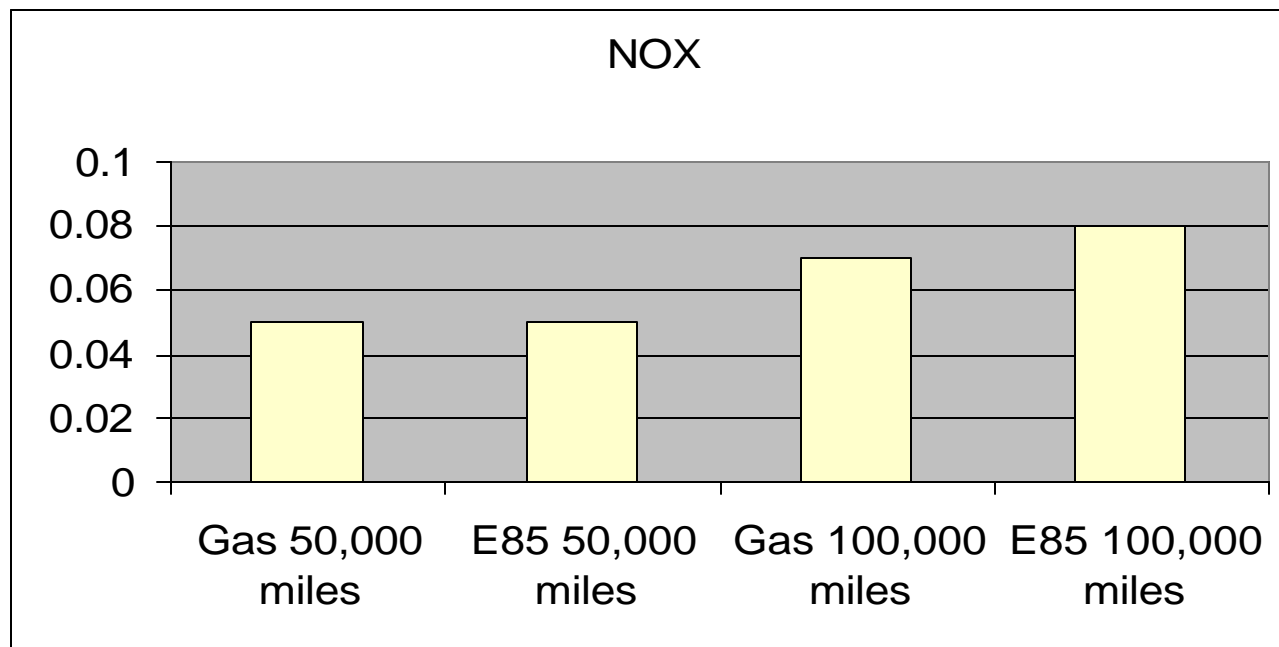


## Taurus Emissions Gas vs E85 gms./mi.





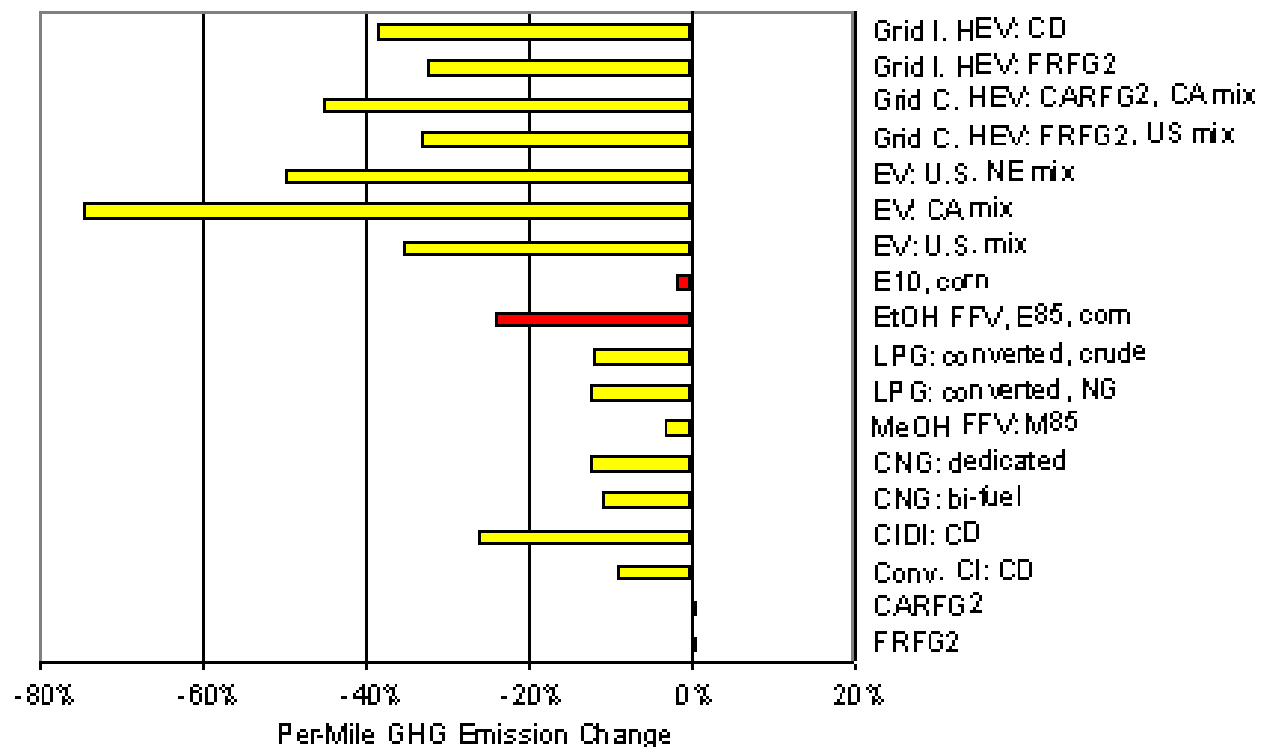
## Taurus Emission Gas vs E85 gms./mi.



Slight increase in NO<sub>x</sub> is due to deterioration of catalyst system



## Per-Mile Changes in Greenhouse Gas Emissions: Near-Term Cars (Relative to Tier 1 GVs)



Argonne National Laboratory  
Transportation Technology R&D Center



# Taurus FFV

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Sedan and wagon models with:

- 3.0L 2-valve V6 flexible fuel engine
- Electronic 4-speed automatic transmission
- 18 gallon fuel tank
- Job 1 (11/6/00) -- Standard on LX, SE and SES for 2001 for Fleet orders. Retail – optional on LX
- LEV certified: it meets stringent emissions standards for non-methane organic gases (NMOG), oxides of nitrogen, and carbon monoxide for federal certification
- Earns Ford significant “CAFÉ” credit – allowing additional allocation of truck\$ and SUV\$!!



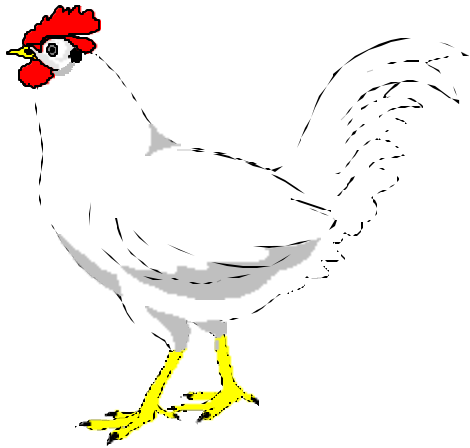
## Current E85 Models-2001

- All 2001 4.0L Explorers
- All 2001 4.0L Sport Tracks
- All 1999, 2000 and 2001 Ford 3.0L Ranger pickups
- All 1999 and 2000 Mazda 3.0L B3000 pickups
- All 2000 and 2001 Chevrolet 2.2L S-10 pickups
- All 2000 and 2001 GMC 2.2L Sonoma pickups
- All 1998, 1999, 2000 and 2001 DC 3.3L minivans
- All 2000 and 2001 Ford 3.0L Taurus LX, SE and SES sedans (also, many 1995-1999 3.0 L Taurus Sedans are FFVs)



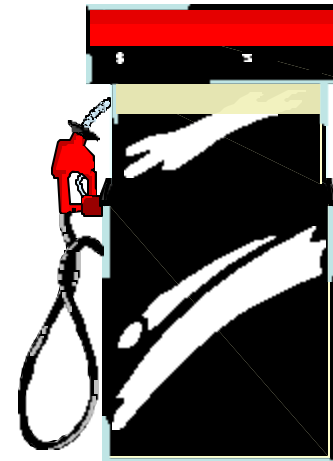
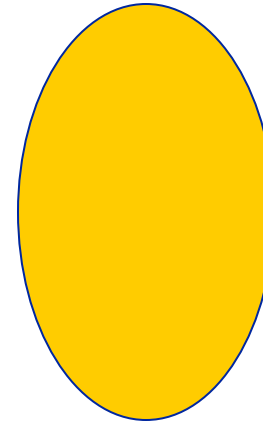
# What comes first?

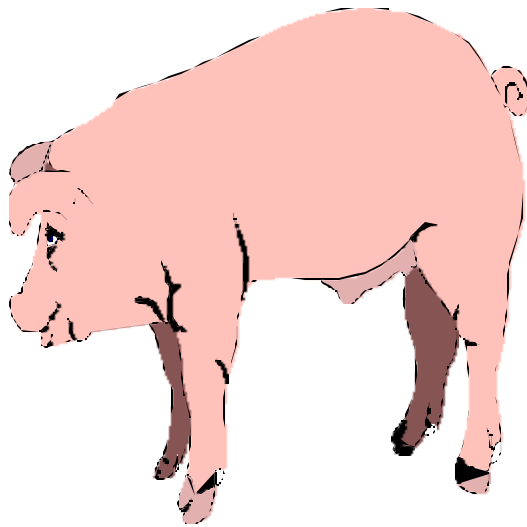
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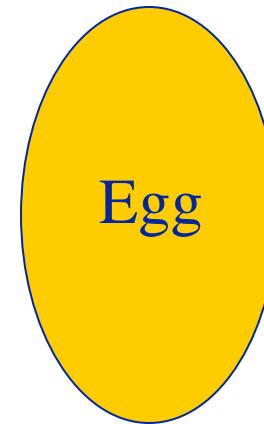
or

EGG





AND







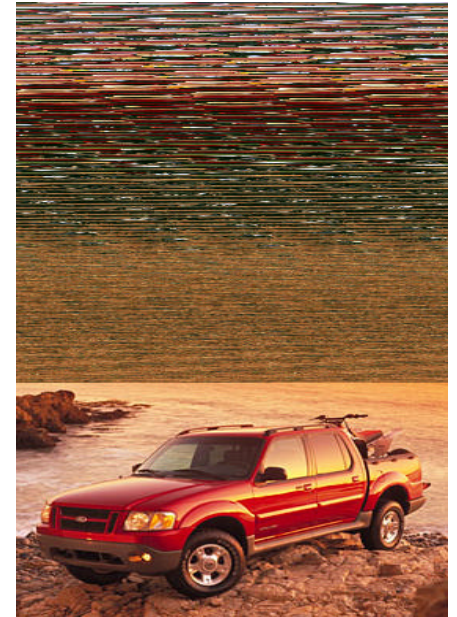
# Explorer Sport FFV

## Explorer Sport Trac FFV

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### New for 2001

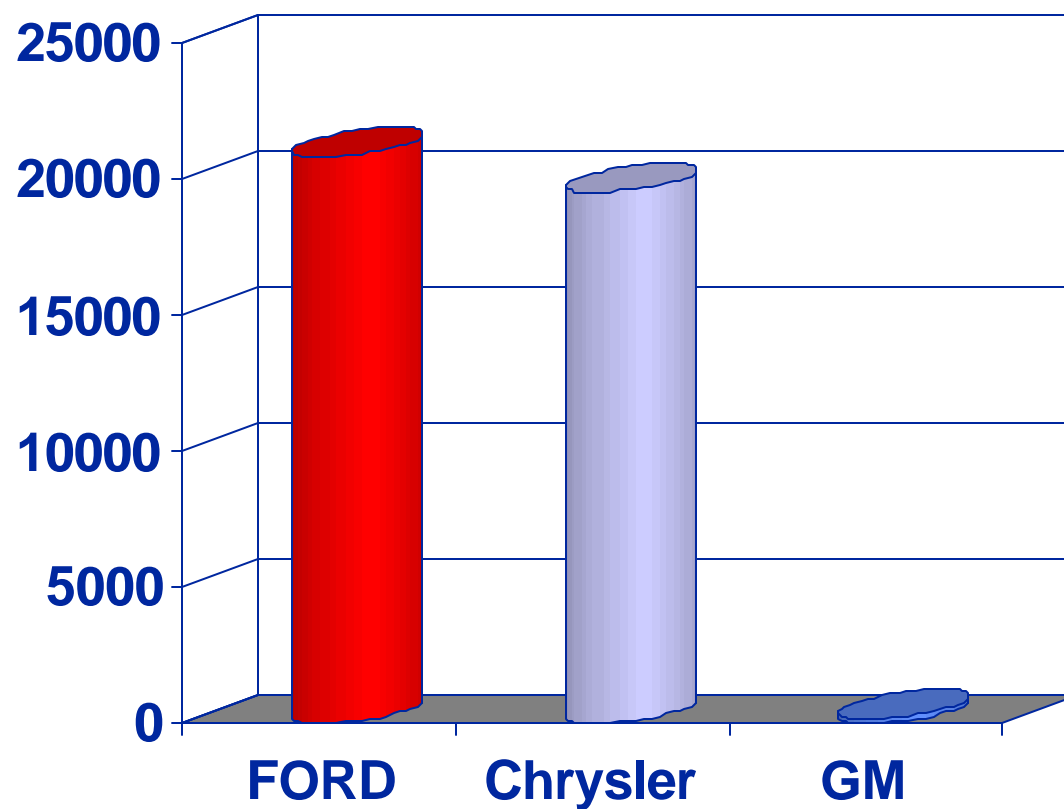
- Standard on models with 4.0L SOHC V6 engine
- FFV engine available January 2001
- 5-speed automatic transmission
- 17.5 gallon fuel tank for Sport
- 20.5 gallon tank for Sport Trac
- Explorer 4-door FFV scheduled for 2002MY
  - Available January 2001CY
  - New 22.5 gallon fuel tank (1.5 gal increase)





# Registered FFVs in MN

Model Years 1998-2000





# E85 Fueling Systems

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- No high pressure fueling systems. Fuels same as gasoline
- All USTs that meet Dec. '98 EPA standards can be used to dispense E85.
- Ethanol does not interact well with aluminum, remove.
- Replace aluminum parts with stainless steel, nozzle, knobs, impeller, etc.
- Teflon hose
- 1 micron filter
- Modify existing unleaded system to dispense E85 for approx. \$2,500

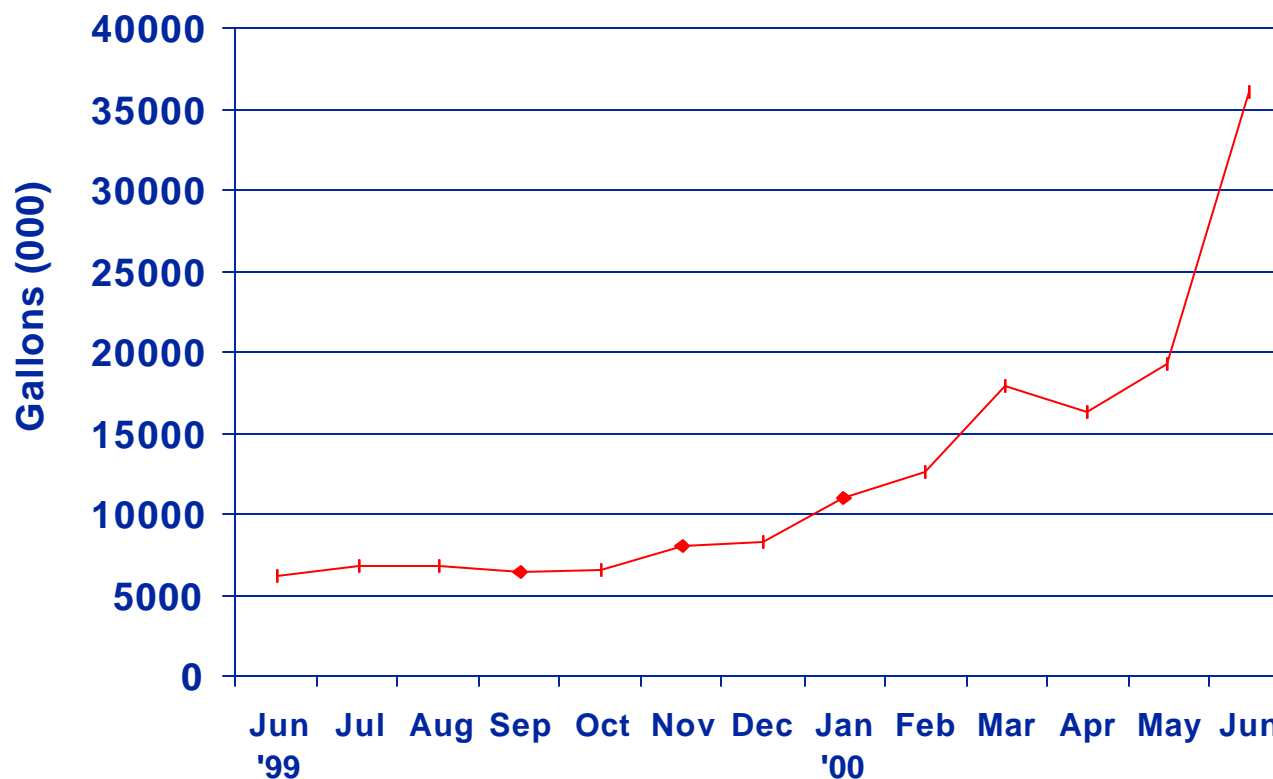


- National Fire Protection Association approved in NFPA 30 & 30A (same as gasoline).
- ASTM 5798 - 98a standard for E85
- Seasonally adjusted for volatility requirements in same fashion as gasoline to eliminate cold start problems and vapor lock difficulties
  - E85 during summer
  - E70 during winter



# E85 Fuel Consumption

June 1999 thru June 2000





# Price of E85 in MN, March 2000

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June 3-6, 2001

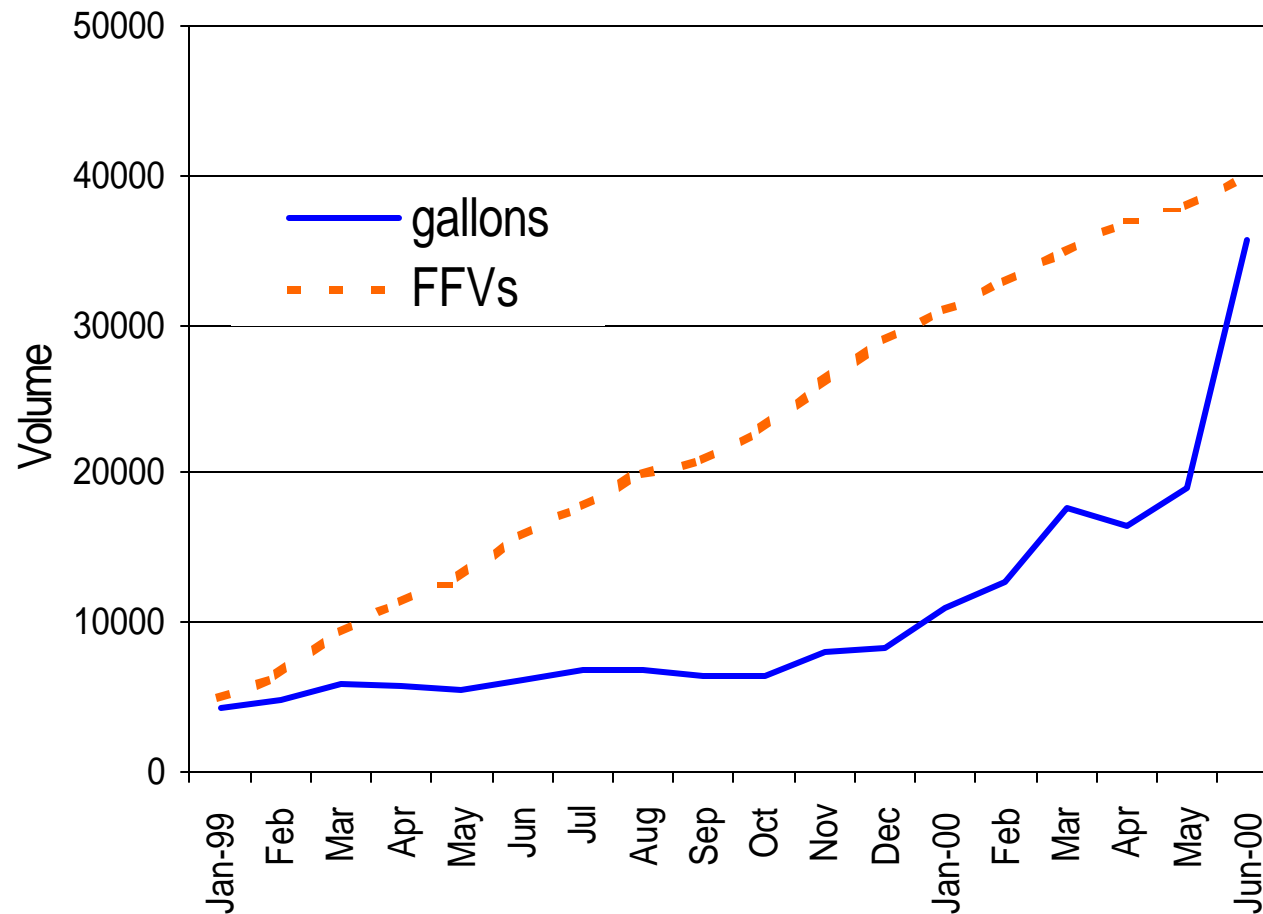
[www.energy2001.ee.doe.gov](http://www.energy2001.ee.doe.gov)

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# E85 Fuel Consumption / FFV Sales

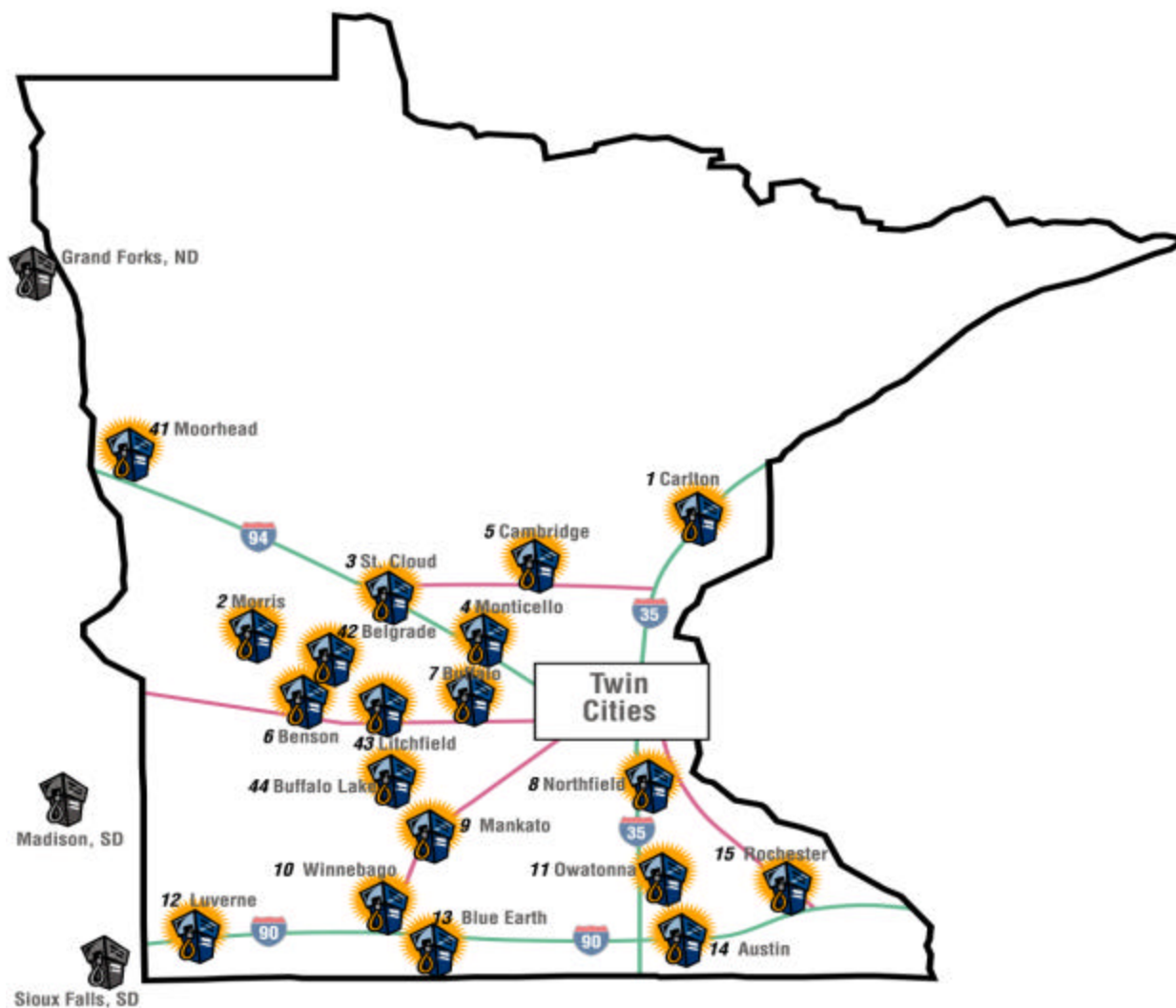
January 1999 thru June 2000







# Minnesota E85 Stations



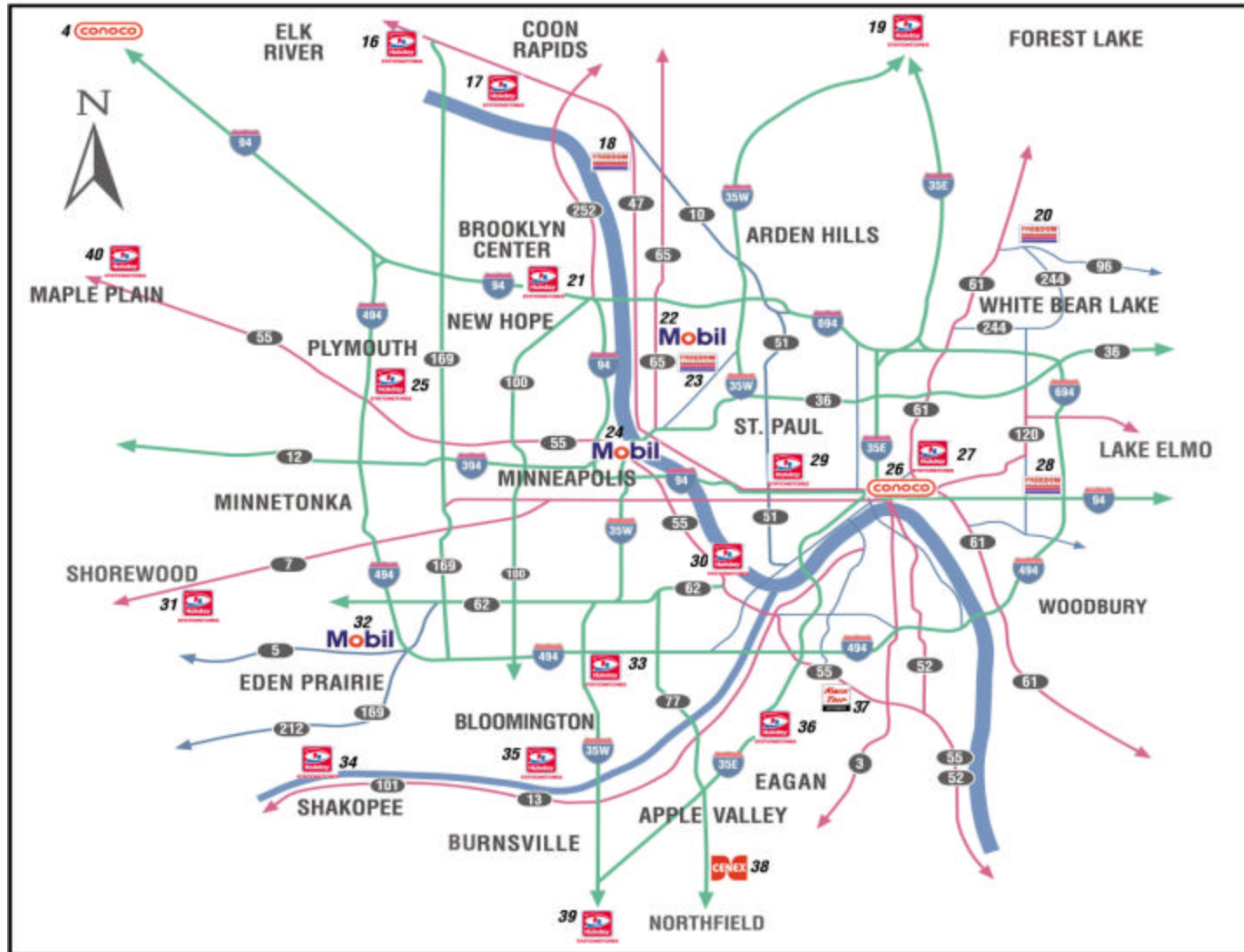
June 3-6, 2001

[www.energy2001.ee.doe.gov](http://www.energy2001.ee.doe.gov)





# Twin Cities E85 Stations



June 3-6, 2001

[www.energy2001.ee.doe.gov](http://www.energy2001.ee.doe.gov)

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# NEVC Contacts

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# National Ethanol Vehicle Coalition



DaimlerChrysler



General Motors

BCI



National Corn Growers Assn



Colorado  
Corn Growers  
Association



Missouri Corn  
Growers Association



Ford Motor  
Company

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# Questions and Answers